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THE UNIVERSITY OF ALBERTA

EARLY BILINGUAL IMMERSION: SOME EFFECTS

by



MELANIE ROGERS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF EDUCATION

in

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and
recommend to the Faculty of Graduate Studies and Research,
for acceptance, a thesis entitled EARLY BILINGUAL
IMMERSION: SOME EFFECTS by MELANIE ROGERS in partial
fulfilment of the requirements for the degree of Master of
Education.

THIS THESIS IS DEDICATED TO

Mom, Dad and Rick

ABSTRACT

The aim of this study was two-fold. First, an attempt was made to determine whether bilingual education influences children's ability to separate objects from their contexts. Second, the word association patterns of unilinguals and bilinguals were compared to determine whether acquiring a second language affects the patterns of response in a child's first language and to determine the differences between bilingual children's response patterns in their first and second languages.

Seventy-eight children participated in this study. Thirty-nine were drawn from the bilingual English-French grade one classes and thirty-nine were drawn from unilingual English grade one classes in two Edmonton schools. The average age of the children in both groups was 6.4 years. All the children came from unilingual English-speaking homes. The Children's Embedded Figures Test (CEFT) (Karp et al., 1963) and the English Word List (EWL), devised by the author, were administered to both groups. The bilingual group also received the French Word List (FWL) also devised by the author. Responses on the word lists were classified as paradigmatic, syntagmatic and clang, following a method similar to that employed by Ervin (1961). Testing was conducted orally and individually in early 1976. The Metropolitan Readiness Test (MRT) (Hildreth

et al., 1969) scores, taken from the cumulative records, were also included in the analysis.

One-way analysis of variance of the CEFT, EWL and MRT revealed that the two groups performed in a similar fashion on the CEFT and EWL. There were no significant differences between the unilingual and bilingual means on the CEFT or EWL subdivisions. Although the bilingual group tended to respond more paradigmatically than the unilingual group on the EWL, the difference did not reach statistical significance. The mean for the bilingual group on the MRT was significantly higher than that for the unilingual group.

The results of the correlated t-test indicated that the bilinguals respond more paradigmatically to English words, particularly to adjectives, and more syntagmatically to French words, again particularly to adjectives.

For the unilingual group, statistically significant negative correlations were found between the CEFT and the EWL syntagmatic total and between the MRT total and the EWL clang total. For the bilingual group, statistically significant correlations were found between the CEFT and the FWL syntagmatic total and between the CEFT and the MRT total. Statistically significant correlations were found between the paradigmatic, syntagmatic and clang totals on

the two versions of the word list.

Even though there were no statistically significant differences between the two groups, with the exception of the bilinguals' higher mean on the MRT, the bilingual group performed as well or better than the unilinguals on all measures. These findings suggest that bilingual experience in kindergarten and grade one in no way hampered the children's cognitive or linguistic abilities as measured by the CEFT, EWL and FWL, or MKT. In addition, children in the bilingual group have the advantage of access to a second language.

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Chapter One

The Problem

Introduction

Educating people to speak more than one language is vital to many nations. Among the effects of scientific and technological interdependence, the advance of mass communication and of the global economy has been a greater reliance upon bilingual individuals. Mackey (1967) estimates that bilingualism affects the majority of the world's population, most people being bilingual to a certain degree, noting that "there are about thirty times as many languages as there are countries to house them" (Mackey, 1967 : 13).

Bilingualism and bilingual education have been important issues for the immigrant Canadian for many years. Since 1972, with the institution of official French/English bilingualism in Canada, they have become important issues for the majority of Canadians. With the increasing number of bilingual schools and the growing political involvement in this type of education, there has been a great deal of concern about its possible merits.

In Canada, mastering a second language, usually French for English speakers and English for French speakers, has

been desirable for purely social and political reasons; such reasons may be more widely understood and accepted than those of a cognitive nature. The focus of the present study is the possible cognitive advantages of bilingualism.

In this chapter, the development of cognition will be overviewed in a general way. The role that language plays in this process will be clarified and the possible effects of becoming bilingual will be presented.

Language and Cognition

Cognition may be defined as awareness that something exists. An object that is cognized is recognized as having certain properties or qualities which differentiate it from other objects in the environment. In this section, the theoretical relationship between language and cognition will be explored.

The investigator agrees with the thesis put forth by Vygotsky (1962) that language serves as a means of leading the child to an awareness of objects and events and to an understanding of their relationships with each other, with the world and with himself. Vygotsky (1962) views language as leading and preceding cognition. He sees the relationship of thought and language as a changing and developing process, with thought and language having distinct roots until about age two, when they come together

to initiate a new mode of experiencing, the verbal mode of cognition. Language does not simply reflect an underlying logic; rather the child's cognitive organization arises from language. By being verbalized, thought takes form and becomes real, or as Vygotsky says: "Thought is not merely expressed in words; it comes into existence through them" (Vygotsky, 1962 : 125). Through the use of and experience with language, the child is led to a certain way of perceiving and cognizing reality that is determined by the cultural and historical basis of the language he is learning and the educational influence of its speakers. Through the medium of language, the child can be led from simply reacting to objects and events to knowing about them to use Werner and Kaplan's (1963) terminology. Language allows the child to analyse, manipulate and create experience, and perhaps more importantly, it enables him to learn more about the world and to refine and organize that which he has already learned. A brief overview of the ways in which language lures the child to awareness and understanding follows.

Affective awareness of an object or event is demonstrated by organismic response to occurrences in the environment. This active interaction between the organism and reality is often called participative cognition, which Church (1973) defines as an unmediated, reflex-like response to the dynamic, affective, physiognomic properties of the environment. Children and adults alike are

constantly participating with their environments, but as children mature, they rely less and less on this mode of cognition and begin to understand the world in a more contemplative way. Language plays a central role in this development.

Right from birth, language sensitizes the child to certain aspects of the environment and prepares him for later verbal behaviour. The infant's cognitions are constantly being reinforced, altered or focussed by the verbalizations of his mother, who speaks to him despite the fact that he doesn't understand the words she uses, and although the mother is often the only person who can comprehend the meaning of the sounds the child produces, he is nonetheless able to communicate his physical states. At an early age, the child becomes sensitized to the possibilities of communication.

Gradually, the child begins to perceive regularities in the environment. This process is often called schematization (Werner & Kaplan, 1963; Schmidt, 1973; Church, 1961). Through mutual acknowledgement of mother and child participating within the same environment, a process which Schmidt (1973) calls coresponsivity, the child begins to perceive the world as an orderly, coherent place in which he can expect certain things to happen, and his actions and reactions reflect the conditions and regularities to which he is sensitized. For example, he

becomes aware that his mother exists even when she is not present, and may cry to bring her to him, or show signs of pleasure when he hears her voice.

For the first few months of his life, the child is a passive receiver of attention, something that is directed, manipulated and controlled by others, by the environment and to a large extent by language, the intended meaning of which he passively understands long before he produces meaningful words or phrases. Before he actually comprehends the spoken word, the child responds to the intention or meaning underlying the communication. As Lewis emphasizes: "The child's response is strongly motivated and highly charged with affect, which is contributed in varying degrees by ... the word itself, the person who speaks it and the situation in which it is spoken" (Lewis, 1963 : 28).

Through continued interaction with the environment, and largely through language, the child also learns that he may act as an initiator of action, as the subject of experience. The interactional and affective character of the child's communication is important, because what the child intends to say is made clear by the situation, and is often understood only by those involved with him who can assume the context. The child may approximate language sounds and patterns for several months before the onset of meaningful speech, but for the most part these

approximations lack intention. The child uses his first meaningful word at approximately two years.

The use of meaningful words marks the discovery of the symbolic function of language, which has been described by Vygotsky (1962) as one of the most important events in a child's life. Naming an object distinguishes it as having certain objective properties. The child's relationship to things and people changes when he can refer to them by name, because by acquiring a means of verbally representing an object, the child becomes able to think about it and reflect upon it without being directly involved with it. As Viaud says:

Dès que l'enfant parle, les mots et leurs relations deviennent les véhicules de ses idées et les conservateurs de ses souvenirs (Viaud, cited in Chauchard, 1973 : 45).

As the child acquires the language spoken by those around him, he is doing more than approximating the intonational and phonetic patterns of others. He is learning to perceive the world in a certain way. Just as he discovers that things have names, the child begins to perceive that there are regularities in the language which govern the ways in which words can be put together. Because words are the souvenirs of his experience, the child learns to organize the world in the same way as those around him do. Words are the building blocks and tools of schematization. Knowing a word enables the child to separate its referent from a generally undifferentiated

environment. The child uses words to learn new words and at the same time, to formulate new schemata. When he mistakenly calls a cat 'dog' and is subsequently corrected, he is learning the new word 'cat' but perhaps more importantly, he is alerted to the physiognomic properties that distinguish the two animals. He refines his schema for 'dog' and creates a new classification for 'cat'. Thus, through interaction with others, certain patterns are reinforced and others are corrected or altered. The child schematizes the regularities he perceives in the language, and at the same time, he schematizes his knowledge in ways that conform to the language patterns he is acquiring.

With the aid of language, he relies less and less on participation as a means of knowing the world and becomes increasingly able to consider his experience in a contemplative way. He becomes able to separate himself from the immediate situation and to reflect upon and analyse his experience from a greater distance. He can call on past experiences to help him solve new problems or cope with new ideas. He gains more knowledge about the world and himself, refines his understandings and becomes more self-directed. Language becomes a dominant form of experiencing because verbalizing reality makes implicit principles manageable and schematizable. Creativity becomes possible because the child can transform or even fabricate events by rearranging their names to suit himself. As Schmidt explains:

Language is not a substitute for direct experience, it

is in itself a mode of experiencing and an activity of apprehending and transforming direct experience as well as symbolically mediated experience (Schmidt, 1973: 119).

Let us now examine, within the bounds of this theoretical framework, the possible relationship between bilingualism, or the acquisition and use of two languages, and cognition.

Bilingualism and Cognition

This study will deal specifically with the cognitive and linguistic development of children who are educated bilingually. It is suggested that the linguistic and perceptual realities of a child who acquires and speaks two languages are qualitatively different than those of a unilingual child.

When a child is acquiring a language, he is also acquiring a socially accepted way of perceiving the world. He is reconstructing the accumulated symbolic reality of his cultural group. As Bain explains:

Just as fishing nets are designed to capture fish of a certain size, shape and type, so, too, are languages designed to capture experiences in a certain way A speaker of a language is thus predisposed to notice certain objects and events and to understand their meaning in a certain way (Bain, 1975: 4).

Language serves as a guide for the organization of experience, and no two languages organize experience in the

same way. Thus, when a child learns two languages, he is reconstructing two different realities.

A bilingual child is accustomed to considering his experience from two points of view. He has two words for each referent in his environment, particularly if he is a compound bilingual, who has learned both his languages in the same setting. He has two ways of combining words and ideas into meaningful language patterns. Because language outlines the fashion in which experiences are grouped and classified, the bilingual child has two ways of schematizing his knowledge. Thus, the bilingual child may be considered to have a cognitive advantage in that he is accustomed to approaching a problem or considering a situation from two points of view.

As was previously discussed, naming an object or an event in the environment differentiates it from other objects or events and distinguishes it as having certain qualities and properties. When the bilingual child learns two ways of expressing reality, he is being sensitized to two qualitatively different ways of perceiving it. Moreover, he is being sensitized to the fact that there are two ways of perceiving it, and that different language-cultural groups may emphasize different aspects of it.

As a child acquires a second language, he is also gaining greater insight into the workings and organization of his first. The bilingual has a second system with which

to compare his first, allowing him to perceive similarities and differences in the ways perceptions are expressed. Depending upon the amount of overlap between his two languages, he may enjoy an enriched understanding of nuances of meaning in both languages and at the same time, his own active language skills may be enhanced. Because he has access to two linguistic systems, he may better understand the roles that language and the various parts of language play in the expression of experience.

Leopold (1961) suggests that there is for the bilingual, a greater distance between the object or occurrence and the word he uses to express it. This observation was confirmed by Ianco-Worrall (1970) in a study which will be discussed in the Review of the Relevant Literature. It is possible that the bilingual child separates the word from its meaning earlier than his unilingual counterpart. In other words, the bilingual child is "less bound to one specific word-object or word-event link" (Bain, 1975: 10). The bilingual may come to understand that words and word combinations are only arbitrary and conventional methods of expressing experience at an earlier age than the unilingual. He may be less dependent upon his symbols and more objective in his understandings of words and of the reality they express.

If language does act as a lure to cognition, it would seem likely that understanding and using two languages

would lead a bilingual child to apprehend certain aspects of reality earlier than the unilingual child. In this study the perceptual and linguistic aspects of the bilingually educated child's reality will be examined to determine whether they are qualitatively different from those of the unilingually educated child. Studies which have explored these and other aspects of the cognitive and linguistic development of bilingual children will be discussed and examined in the Review of the Relevant Literature.

Need for the Study

Recent research, some of which will be discussed in the Review of the Relevant Literature, tends to suggest that under certain conditions bilingual education may be beneficial to children both for practical and psychological reasons. There remains, however, a great deal of concern among parents and educators alike about the merits of this kind of instruction. Research is necessary to dispel these doubts and concerns about a potentially valuable way of educating children.

Purpose of the Study

The purpose of this study is to compare the perceptual and linguistic realities of children educated bilingually in French and English with those of children educated unilingually in English to determine whether qualitative differences exist.

Statement of the Problem

Two problems are considered in this study:

1. Do any qualitative differences exist between the perceptual realities of unilingually and bilingually educated children?

2. Do any qualitative differences exist between the word-response patterns of unilingually and bilingually educated children?

Specifically, answers are sought to the following questions:

1. Do bilingually educated children perform significantly differently from unilingually educated

children on a measure of perceptual ability, the Children's Embedded Figures Test (Karp et al., 1963) ?

2. Do bilingually and unilingually educated children respond in a significantly different manner to a list of English stimulus words?

3. Are the responses of bilingually educated children to stimulus words in English significantly different from their responses to stimulus words in French?

Definition of Terms

Bilingual- For the purpose of this study, bilingual will refer specifically to those children enrolled in the Edmonton Public School Board's bilingual English-French program, who have completed kindergarten and attended grade one in this program, and who spoke or understood no language other than English before attending school.

Unilingual- For the purpose of this study, unilingual will refer to those children enrolled in the Edmonton Public School Board's English grade one program, who have completed kindergarten in English and who spoke or

understood no language other than English before starting school.

Word Response Test- This is a test which requires respondents to freely associate words with the stimulus words provided.

Associate- An associate is the word produced in response to a given stimulus word. Four types of associates will be considered in the present study:

1. **Paradigmatic-** A paradigmatic response is that which is typically of the same grammatical class as the stimulus word and which cannot easily be combined with the stimulus word to form a commonly occurring verbal sequence. (e.g. bird, animal)

2. **Syntagmatic-** A syntagmatic associate is that which shows some sequential relationship with the stimulus word. It is not of the same grammatical class as the stimulus word and can be easily combined with the stimulus word to form a commonly occurring verbal sequence. For the purpose of this study, transformations, or inflected or changed forms of the stimulus word, will also be considered syntagmatic. (e.g. bird, flew; bird, birds)

3. **Clang-** A clang associate is that which is produced in response to the sound qualities of the stimulus. Also

included in this class are associates which show no grammatical or semantic relationship to the stimulus.

4. None- If no response is given to the stimulus word, it will be designated 'none'.

Grammatical Class- An associate will be considered a member of the same grammatical class as its stimulus if it would behave in the same way as the stimulus in a sentence. The grammatical classes to be considered in the present study are:

1. **Noun class-** Those words on the stimulus lists which are commonly used by native speakers to name or denote persons, places or things will be considered members of the noun class.

2. **Verb Class-** Those words on the stimulus list which are commonly used by native speakers to express action, existence or occurrence will be considered members of the verb class.

3. **Adjective Class-** Those words on the stimulus lists which are commonly used by native speakers to limit or qualify members of the noun class will be considered members of the adjective class. Those words which express quantity or number will also be included in this class.

Chapter Two

Review of the Relevant Literature

Bilingualism has been a topic of interest to researchers for many years. Stern (1963) reports that a bibliography of bilingualism produced by the Aberystwyth Collegiate Faculty of Education in 1960 listed nearly one hundred titles. Many of the older studies found bilinguals lagging behind unilinguals in intelligence, achievement and reasoning but it could be argued that in many cases inappropriate measures and lack of controls could account for these results. More recent studies have tended to show that bilinguals may have an advantage over unilinguals in terms of intellectual functioning.

The first major study to demonstrate the superiority of bilinguals in measures of intellectual functioning was Peal and Lambert's study (1962). Lambert and Peal compared unilingual and bilingual children on a variety of measures. Subjects were ten year-old children from six middle-class French schools in the Montreal area. Bilingualism was very carefully controlled, and only children who were equally skilled in each of their two languages, French and English, were considered bilingual for the purpose of their study. In all, 164 students, 75 French-speaking unilinguals and 89 English-speaking English-French bilinguals were tested.

The children were given three tests of intelligence which measured verbal and non-verbal ability, an achievement measure and an attitude measure. Since the results of these last two tests are not relevant to the present study, they will not be discussed here.

The bilinguals performed significantly better than the unilinguals on some of the non-verbal measures, particularly those requiring symbolic reorganization. Two possible explanations could be presented to account for these results. First, there is a high correlation between language aptitude and intelligence, (Gardner and Lambert, 1959), and perhaps it is the more intelligent children who become balanced bilinguals, equally skilled in their two languages. In the Montreal situation, the intelligent children would perhaps see more clearly the advantages of becoming bilingual.

On the other hand, these results support the hypothesis that having access to two linguistic systems allows for a greater degree of mental flexibility. It has been suggested that bilinguals may tend to separate words and their referents to a greater degree and at an earlier age than unilinguals. Since the ability to think in terms of abstract concepts and relations independent of the word is required on measures of symbolic organization, bilinguals would likely perform better on this measure than unilinguals, who may be confined to a certain extent by

reliance on language. It has also been suggested that bilinguals may tend to choose alternative means of solving problems more readily than unilinguals, who are accustomed to considering their experience from one perspective only. The results of Peal and Lambert's study tend to support these suggestions. The bilinguals demonstrated a greater ability to think and solve problems independently of language than the unilinguals.

The bilinguals also performed significantly better than the unilinguals on verbal intelligence measures. Peal and Lambert suggest that these results may reflect the overall superior intelligence of the bilinguals, and that the selection procedure could have excluded children with small English or French vocabularies. These results could be interpreted as indicating that access to two linguistic systems leads one to a greater understanding of the function of language per se and of the subtleties of word meaning. Using two languages may enhance the children's expressive verbal skills. Bilingual children have larger vocabularies than unilingual children, in the sense that they have two words for every referent in their environment. The overlap between the English and French languages is considerable, and knowing a word in French may help the child to understand the meaning of a related English word. The bilinguals may also be considered to have a broader experiential base from which to draw information because of their familiarity with and participation in two

language-cultural groups, and it is possible that they were more able to deal with the types of problems and ideas presented in the tests.

The results of their study suggest that access to and use of two languages may have an advantageous effect on both verbal and non-verbal intelligence. The findings also shed considerable doubt on the validity of the negative outcomes of many of the studies which preceded it. This study demonstrated that children who are equally skilled in two languages benefit in certain areas of intellectual ability from their bilingualism.

It has been postulated by several researchers that acquiring and using two languages could lead the bilingual child to an earlier apprehension of certain concepts. Liedtke and Nelson performed a study in 1968 aimed at determining whether bilingualism has any effect on the attainment of the concepts of length conservation and measurement. The sample of 50 unilingual children with one-language experience at home and in school and 50 bilingual children with two-language experience in home and at school was selected from nine grade one classes in six Edmonton schools. The children were presented the Concepts of Linear Measurement Kit (Liedtke and Nelson, 1968). The children's SES, age and IQ were recorded from the school records for inclusion in the analysis.

The results of the analysis indicated the superiority

of the bilingual group. The means for this group on the conservation and measurement tests were significantly higher than the means for the unilingual group. Analysis also showed that although age and SES had no effect on the outcomes, IQ was an important factor. The bilingual group tested higher on the IQ measure than the unilingual group.

One criticism of this study concerns the method of selection of the bilingual group. These children were chosen with the help of their teachers, who may have selected those students they thought would do well on the tests or who could best afford to miss class instruction time. Thus, it is possible that the most intelligent children were chosen for this group, a possibility that could have prejudiced the results on the IQ measure. However, Peal and Lambert's (1962) study has demonstrated that it could be argued that bilingual experience had contributed to the superior performance on the IQ test.

Liedtke and Nelson concluded from these results that bilinguals conserve length at an earlier age than unilinguals. Although this conclusion could be questioned on the basis of selection bias, the findings of this study are in agreement with the general trend reported by Peal and Lambert (1962) that bilinguals may think in terms of abstract concepts and relations more readily than unilinguals. The findings of this study lend support to the thesis that bilingual experience may tend to lead one to

apprehend certain aspects of reality at an earlier age.

These investigators suggest that the findings of their study support the introduction of a second language in the early grades when experience and environment are most likely to affect cognitive development. The author of the present study would argue that this suggestion may be somewhat hasty, since learning a second language in elementary school cannot be equated with continuous bilingual experience in the home and at school. It has been emphasized throughout the first chapter that the social interaction aspects of language acquisition play an extremely important role in learning and organizing experience. Unilingual and bilingual home environments may be considered to be qualitatively different because the types of interactional patterns and experiences in these two types of homes are different. Continuous bilingual experience and its possible advantages cannot be equated with the language experience of children who are educated bilingually but come from unilingual homes.

Ianco-Worrall performed an empirical study in 1972 to test Leopold's observation that there is greater separation between a word and its meaning for the bilingual child than for the unilingual child. She was very careful to include only those children who had had continuous bilingual experience from an early age in her bilingual sample. Bilingualism was defined as dual acquisition of language in

a one-person one-language home environment, and thus all the children considered bilingual in her study were raised under circumstances similar to those described by Leopold. The sample consisted of 30 Africaans-English bilinguals, aged 4-6 and 7-9 years. Each bilingual was paired with two unilingual children, one Africaans-speaking and one English-speaking, matched with the bilingual on intelligence, age, sex and social class.

The subjects were given two tests. The first was designed to determine whether the children displayed a semantic or phonetic preference for words. The subjects were required to select one of two choice words that best accompanied the given standard word. One of the choice words was related to the standard by meaning, and the other was related by its phonetic properties. The second test, based on a technique described by Vygotsky (1934), was designed to determine whether children understood the arbitrary nature of symbol-referent combinations. The first part of this test required the children to explain six names, the second part asked them whether or not these names could be interchanged, and the third part involved interchanging these names in a game situation.

The results of the analysis indicated support for Leopold's observed separation of word sound from word meaning. On the first test there was a significantly higher proportion of bilinguals in the younger group who chose to

interpret similarity of words on a semantic basis. This result tends to support the suggestion previously made that bilingual experience may lead one to better understand at an earlier age the symbolic function of language.

Analysis of the results of the second test showed little difference between the bilinguals' and the unilinguals' abilities to separate the names from the objects in play. However, the bilinguals were more able to consider names as being arbitrarily assigned to objects. In the younger age group, the superiority of the bilinguals approached significance, and in the older group the difference in performance was significant. As Ianco-Worrall (1970) suggests, the ability enabling bilinguals to interchange the names of objects requires the earlier formation of the concept that names are arbitrarily assigned to objects. This finding supports the trends indicated in the research conducted by Peal and Lambert (1962) and Liedtke and Nelson (1968), which suggests that bilinguals may grasp certain concepts more readily than unilinguals.

This well-prepared and well-conducted study also lends considerable support to one of the basic assumptions underlying much of the recent research on bilingualism: that bilinguals may possess a greater degree of mental flexibility than unilinguals because the link between words and their meanings is looser for bilinguals than for speakers of one language.

Thus, it would appear from the research of Ianco-Worrall and that of the researchers previously mentioned that bilingual children, equally skilled in their two languages and/or with bilingual experience from an early age enjoy certain cognitive and linguistic advantages. To this point, however, the possible effects of a difference in home and school language experience have not been examined. As was previously emphasized, it can not be assumed that the kinds of advantages balanced bilinguals may enjoy will also be experienced by children who are not equally skilled in their two languages. What are the possible linguistic and cognitive consequences of following a bilingual program at school after having unilingual experience at home?

A study performed by Cummins and Gulutsan (1974) explored this and several other aspects of bilingualism. One objective of the study was to reexamine the 1962 findings of Peal and Lambert to determine whether bilinguals perform better than unilinguals on tests of verbal and non-verbal intelligence in the Edmonton area. Since the Edmonton community is predominantly English-speaking, the quality of bilingual experience in this city may indeed be different from that in Montreal, where there is a predominance of French speakers. A second objective was to examine the effects of bilingualism on divergent thinking. In addition, this study aimed at considering the

effects of bilingual education on the cognitive development as a function of home-language background. Three home-language background possibilities were examined: unilingual English, unilingual French and bilingual English-French.

A sample of 61 bilingual students was selected from grade six classes at three schools within the Edmonton Separate School System. Of these, 25 were judged to be from French-speaking homes, 24 from French-English homes and 12 from English-speaking homes. Thus children who were unilingual French or English speaking when they entered the bilingual program had an opportunity to interact with speakers of their first language, with bilingual speakers of both languages and with unilingual speakers of their second language. Sixty-one unilingual English-speaking students, matched with the bilinguals on the basis of age, sex and SES, were selected from similar schools in the Edmonton Public School System.

The children's scores on a balance measure, two intelligence tests and on a test of divergence were included in the analysis. One-way analysis of variance showed that the bilingual group performed significantly better than the unilingual group on the verbal ability and general reasoning subtests and on originality in the verbal test of divergence. These results are in general agreement with the results of Peal and Lambert (1962).

When analysed as a function of home-language

background, these results prove to be very interesting. Those bilinguals from French-speaking homes showed the highest degree of linguistic balance, followed by those from bilingual backgrounds and then those from English-speaking homes. The mean of this first group, however, was significantly lower than those of the two other groups on the verbal ability subtest, which was administered in English. As was emphasized in the first chapter of this thesis, the child learns about the world through a coresponsive interactional relationship with a caring adult and through the medium of language. The children from French-speaking homes likely obtained their surface competency in English through interaction, at a fairly low level of conceptual complexity, with their peers once they started school. Before starting school, their interaction with older people was in French, and perhaps, as the researchers suggest, "their English interaction with adults in a cognitively demanding situation at school is insufficient to allow them to adequately express their intelligence through this medium" (Cummins and Gulutsan, 1974: 266-67). It is also possible that the French group would have performed better on a verbal intelligence measure administered in French.

The result of the divergent thinking measure, that the bilinguals performed significantly better on the measure of originality, supports the possibility that bilinguals enjoy a greater degree of mental flexibility than unilinguals.

The originality score reflected the uniqueness of uses listed for common objects. The bilingual may be more flexible in his perception and understanding of a situation because he is accustomed to perceiving reality from two points of view. This may explain why the bilinguals were able to suggest more imaginative uses for the objects in the subtest.

On the intelligence measures, the advantage of the French-English group is evident although not significant statistically. This result suggests that those children with continuous bilingual experience from an early age tend to benefit to the greatest extent from bilingual education. However, since the means of the bilingual group as a whole were significantly higher than for the unilingual group, it would appear that children from both unilingual and bilingual homes can benefit from this kind of schooling.

It has been demonstrated in the studies previously discussed that bilingual children, especially those with continuous bilingual experience from an early age, tend to perform better than their unilingual counterparts on measures of verbal intelligence and on those tests of non-verbal intelligence which require symbolic reorganization. It has been suggested that bilinguals demonstrate semantic rather than phonetic preference at a younger age than unilinguals. It has also been shown that bilinguals may tend to attain certain concepts at an earlier age than

unilinguals, specifically concepts of length conservation and measurement and of the arbitrary assignment of names to objects.

Bain, in his 1974 study, examined the effects of bilingualism on problem-solving ability and sensitivity to emotional expression. His study was divided into two parts. The first part was designed to determine whether access to and use of two languages results in differences in performance on a measure of problem-solving ability involving tasks that demand logical operations. The sample consisted of ten balanced bilinguals and ten English-speaking unilinguals selected from grade six classes in Edmonton schools. The subjects were matched on SES, IQ and developmental level of operations.

Each subject was tested individually. Each was presented with tasks requiring the discovery of a rule which would allow him to draw certain conclusions or make certain predictions, and then the application of the rule to a novel situation. The time required to discover the rule and then to transfer it was recorded. There were no significant differences between the bilinguals and unilinguals in the time required to transfer the rule once it was discovered. However, although the discovery time differences were not statistically significant, the bilinguals tended to discover the rules more quickly. The results of this study are in agreement with the trends

established in the research of Peal and Lambert (1962), Leidtke and Nelson (1968) Tanco-Worrall (1970) and Cummins and Gulutsan (1974). Bilinguals may tend to grasp certain aspects of reality more readily than unilinguals.

This study and the ones which preceded it were concerned with possible advantages bilinguals may experience in situations of a contemplative nature. The problem-solving task, like the tasks of measurement and conservation used by Liedtke and Nelson (1968) and the intelligence measures used by Peal and Lambert (1962) and Cummins and Gulutsan (1974), required the subjects to analyse and reflect upon a set of information to come up with an appropriate conclusion.

The second part of Bain's (1974) study sheds new light on another aspect of cognition, the participative mode. Participation, as was previously explained, is an unmediated, reflex-like response to the dynamic, affective, physiognomic properties of an object or event. This part of Bain's study was designed to determine whether access to and use of two languages results in differences in performance on a test of sensitivity to emotional expression. The sample consisted of 42 French-English balanced bilinguals and 42 English-speaking unilinguals selected from Edmonton schools. The subjects were presented the Portrait Sensitivity Test (Bain, 1973), which consists of 24 black and white portraits, each expressing one

dominant emotion. The portraits were presented on slides on a screen to small groups of children. The subjects were asked to choose one of love, surprise, fear, anger or contempt as the emotion expressed in the portrait. The number of correct responses was tabulated for each subject.

The difference between the mean number of correct responses was significant, with the bilinguals performing significantly better than the unilinguals, suggesting that linguality is a factor in sensitivity to emotional expression.

It is suggested by the research of Bain and the previously mentioned writers that bilingual children, equally skilled in their two languages and/or with bilingual experience from an early age enjoy certain advantages in both the contemplative and participative modes of cognition. Cummins and Gulutsan (1974) have shown that home-language background may have an effect upon the extent to which the child may benefit from bilingual education. The children in their sample, although they came from unilingual homes, had speakers of both their languages as peers. What are the possible effects of following a bilingual-immersion program in which the teacher acts as the sole model of the second language?

Lambert and Tucker (1972, 1973) reported the results of a seven year evaluation of a bilingual-immersion program in Montreal. This program was initiated at the request of

unilingual English-speaking parents in 1965. Children participating in the program spoke English at home. The program was conducted in English schools, so that the majority of the children's peers were unilingual English-speaking. The classroom teacher acted as the only model of French, at least in the early stages of the program. Kindergarten classes were taught entirely in French, and in grade one, reading, writing and arithmetic were introduced in French. All materials were designed for children with French as a mother tongue. English was gradually added to the curriculum in later grades so that by grade seven, approximately half the instruction was carried out in each language.

An intensive battery of individual and group tests was administered each spring from grade one to grade seven. Three groups of children were tested, the bilingual group, a unilingual English-speaking group from the Montreal English system and a unilingual French-speaking group from the French system. These tests assessed achievement in French and English language arts, listening comprehension and speaking skills in both languages, foreign-sound discrimination, problem-solving and computational skills in arithmetic, cognitive flexibility and creativity, verbal and non-verbal intelligence and ethnic attitudes.

The outcomes of the evaluation indicate that the program was successful. The bilinguals performed as well as

or better than the controls in all measures of receptive and expressive English skills. At the grade five level, there were no instances of the bilingual group lagging behind the English controls. By this grade level, they had attained functional competence in French which permitted them to read, write, comprehend and speak French with native-like fluency, although they were not able to speak and write as well as the French controls, perhaps because their conceptual vocabulary in this language was not yet as large as that of children in the French control group. The bilinguals were as creative or more creative than the controls. Thus, the results indicate that the bilingual group had not been hampered linguistically or intellectually by their bilingual experience.

Also included in the evaluation of linguistic competence was a word-association test similar to that used by Ervin (1961). Ervin identified three kinds of responses: paradigmatic associates, which are members of the same grammatical class as the stimulus word; syntagmatic associates, which follow or precede the stimulus word in common verbal sequences; and clang associates, which correspond to the stimulus by way of phonetic similarity or which show no similarity to the stimulus whatsoever. She suggests that paradigmatic responding displays a higher degree of linguistic maturity and that the tendency to respond paradigmatically increases with age, because both vocabulary and the number of verbal contexts in which words

are used also increase. Clang responding tends to decrease with age and Ervin suggests that this fashion of responding is linguistically immature.

The procedure and results of the grade one word-association test will be discussed here since the investigator intends to reexamine them in the present study. Two lists of 51 words each, one list in English and one list in French, were presented orally on tape to individual children. Their oral responses were recorded and the average time required to respond was noted. As in Ervin's (1961) study, responses were classified as paradigmatic, syntagmatic or clang. The results of the analysis indicated that the responding patterns of the grade one class were basically similar to those of the unilingual controls. Responses on both versions of the test were as rapid as those of the controls, indicating that the bilinguals did not require time to translate the French stimulus words before responding. On both versions of the test, the number of paradigmatic responses was the same, but there were reliably more syntagmatic responses given by the bilingual group than by the control. There were fewer instances of clang responding in the bilingual group than in the unilingual groups.

The investigator suggests that the nature of immersion-type schooling should be considered. The children in this program came from English-speaking homes. The

greater part of their communication with family and friends would be conducted in English. French contact would be confined, at the early stage of grade one, to interaction with the classroom teacher. Classroom interaction is on a fairly formal level in comparison with peer relations or family interaction, and from the first, the experimental children would be exposed to an orderly, adult-oriented French. Since context variety would be limited by the types of situations provided in the class by the teacher, the bilingual children might tend to rely to a greater extent than unilingual speakers upon learned grammatical sequences, which may explain their greater usage of syntagmatic responses in French. Second-language acquisition at school is well-organised, methodic and systematic compared to the kinds of sound and word play a child experiences in infancy and early childhood with his peers and family while learning his first language. It is possible that this kind of language acquisition at school could lead children to a more formal approach to French, and may explain why the bilingual group produced fewer clang associates.

As has been suggested several times previously, knowledge of a second language may lead one to a more comprehensive awareness of the regularities of the first language and of the symbolic function of language in general. Ianco-Worrall (1970) noted that bilingual children tend to choose words on the basis of semantic similarity

rather than on the basis of phonetic correspondence earlier than unilingual children. This could perhaps explain why the bilingual children produced fewer clang responses on the tests.

The results of the evaluation suggest that under certain conditions, children from unilingual homes may benefit cognitively and linguistically from bilingual schooling. Thus, although not all children have the opportunity to become bilingual in early childhood, bilingual experience during the school years may be advantageous. The social and political situation in Montreal at the time of the initiation of the program and later made the practical advantages of being bilingual very evident, and the motivation of both the children and their parents would likely be very high. The degree of parental interest is indicated by the fact that they requested that the program be initiated. Further research is required to determine to what extent these factors contributed to the success of the program.

In summary, the research which has been examined in this chapter has demonstrated that bilingual children may experience advantages in both the contemplative and participative modes of cognition. It has been shown that bilinguals may tend to grasp certain concepts more readily and that they may possess a greater degree of mental flexibility than their unilingual counterparts. It has been

suggested that bilinguals may also enjoy certain linguistic benefits and that, under certain conditions, children from unilingual homes may benefit cognitively and linguistically from immersion-type bilingual schooling.

The aim of the present study was two-fold. First, the investigator intended to examine the bilingually-educated child's ability to separate objects from their surroundings. As was discussed in the first chapter, the child schematizes the regularities he perceives in his environment and learns to differentiate certain objects and events. Language plays a central role in this process, because naming an object or event sensitizes the child to the properties or qualities which distinguish it. By verbally representing an object or event, the child is able to consider it or reflect upon it as an objective entity. It is hypothesized that the bilingually-educated child may be better able to separate objects from their contexts than the unilingually educated child.

Secondly, the investigator intended to reexamine, within the Edmonton context, the results of the word-association technique used by Lambert and Tucker (1972).

Chapter 3

The Sample, the Procedure and the Tests

Description of the Sample

Seventy-eight children participated in this study. Fifteen boys and 24 girls were chosen from the bilingual English-French grade one classes at McKee and Greenfield Elementary Schools in Edmonton and 20 boys and 19 girls were selected from the unilingual English classes at the same schools. Only children whose mother tongue was English and who had not spoken any other language before starting school were selected to participate in this study. All the children had previously attended kindergarten within the Edmonton Public School System. Those in the bilingual group had attended bilingual kindergarten. The Edmonton Public School Board's bilingual program was initiated in September, 1974. Instruction in kindergarten in this program is conducted ninety per cent of the time in French. Fifty per cent of the instruction in grade one is conducted in French and fifty per cent in English. Reading and writing are initially introduced in English, several weeks before its introduction in French. Although classes vary, as a general practice, mathematics and science are also taught in English and social studies, music, art and

physical education are taught in French. The language spoken and the time allotted to the various subjects is summarized in the appendix.

Each student's age, language background and parents' occupations were taken from the cumulative record. The scores on the Metropolitan Readiness Test, (Hildreths et al., 1969), which is routinely administered by the school board to all children entering grade one, were also recorded for later use in the analysis.

The ages of the children in the bilingual group ranged from 6.0 years to 6.5 years. The ages of those in the unilingual group ranged from 5.9 years to 7.0 years. The average age in each group was 6.4 years. SES was estimated from the geographic location of the schools and from the occupations of the children's parents. Greenfield and McKee Elementary Schools are in the same area of Edmonton and the children who attend them come from homes of similar SES. Roughly speaking, the SES of the sample may be characterized as middle-class.

The Procedure

Permission to conduct the study was obtained from the Edmonton Public School Board. The researcher requested that Greenfield and McKee Elementary Schools be involved because

of the number of students enrolled in the bilingual program at each school and because of their geographic proximity and similarity. The investigator met with the principal and teachers at each school to discuss scheduling and to explain generally the testing which would be conducted. Students were not informed about the nature of the tests.

Testing was completed during the two-week period from January 26th to February 10th, 1976, at the respective schools. All tests were administered individually and orally. The English Word List (EWL) was administered by the researcher, the French Word List (FWL) was administered by a bilingual undergraduate student from the University of Alberta and the Children's Embedded Figures Test (CEFT) was administered by a graduate student of Educational Psychology at the University of Alberta. The responses to all three tests were written down by the examiner and those for the EWL and FWL were also tape recorded.

The children were tested during regular class time, and care was taken to avoid conflicts with recess and special classroom activities.

The Tests

CEFT

The Children's Embedded Figures Test (CEFT) was developed by Karp *et al.* in 1963. It is a standardized test. Children are asked to find and separate a figure, either a house shape or a tent shape, which is embedded within a larger more complex figure. There is no time limit imposed. The CEFT is designed to measure a child's ability to separate either himself, an object or design from the context.

EWL and FWL

Two lists of twenty-three words which had been cross-translated by bilingual students at the University of Alberta were each piloted in November, 1975. The French Word List (FWL) was piloted at Grandin Elementary School in Edmonton and the English Word List (EWL) was piloted at Duggin Elementary School. The purpose of these pilot runs was to insure that all words on the lists would be familiar to children in grade one when presented orally. The FWL was administered by a bilingual female and the EWL was administered by the investigator. Children were tested individually and orally and responses were written down and

tape recorded. The test was explained as a game. The children were told that when a person hears a word, he often thinks of another word, and to respond to each stimulus with whatever word first came to mind. All answers were accepted. Twenty unilingual English-speaking children from Duggin and seven unilingual French-speaking and seven French-English bilingual children from Grandin took part in these pilot runs.

Of the twenty-three words on the original lists, there were four nouns, four verbs, four adjectives, four adverbs, four pronouns, two conjunctions and one preposition. Since the children responded consistently to the nouns, verbs and adjectives and hesitantly or not at all to the words from the other grammatical classes, it was decided that the list should be revised to include only words from the noun, verb and adjective classes. In addition, the adjective red was changed to yellow because it was confused with the past participle read. The adjective chaud, , which was confused with the noun show, a word used frequently in Canadian French, was changed to petit. The administration procedure proved to be efficient and the test instructions were easily understood by the children.

The revised word lists each contained twenty-one words, seven nouns, seven verbs, and seven adjectives. All words on the FWL are contained in Le français fondamental premier degré (1970) and those on the EWL are contained in

A Canadian Word List- Grades I-VI (1947) in the section of words used by grade one children. The words were ordered randomly using a table of random numbers.

These revised lists were piloted at Duggin Elementary School in January, 1976, using children enrolled in the bilingual program there. Eight children participated in this pilot run, five boys and three girls. The children were first administered the EWL by the investigator using the procedures outlined previously. Three days later, they received the FWL, which was administered by a bilingual undergraduate student. All words on these revised lists proved to be familiar to the children. A copy of each list may be found in the appendix.

The three types of responses identified by Ervin (1971), paradigmatic, syntagmatic and clang, were used to categorize the results and to score the EWL and FWL. In addition, the number of 'none' responses was calculated.

For the purpose of this study, if a child responded to the stimulus word with a word of the same grammatical class, this response was classified as paradigmatic. Thus, garage in response to house was considered to be a paradigmatic associate. If he answered with a word which normally precedes or follows the stimulus word in a common phrase or expression or if the response was a grammatically changed form of the stimulus, it was classified as a

syntagmatic response. Thus, white in response to house was considered syntagmatic, as was houses. If the child responded with a word either unrelated to the stimulus or related only by sound similarity, it was classified as a clang associate. Rhyming associates and nonsense words, such as pouse in response to house, were classified as clang responses. If the child did not respond to the stimulus, his lack of response was tabulated as 'none'.

Paradigmatic, syntagmatic and clang received priority in that order in cases where there was some doubt about the category into which the response should be placed. Bake in response to make, although a rhyming associate, was classified as paradigmatic, since both words are members of the verb class. Similarly, cake in response to make was classified as a syntagmatic response, since these words often occur together in a common phrase, such as She likes to make cake.

The lists were first checked by the examiners and then cross-checked by the investigator and a bilingual graduate student from the University of Alberta to insure agreement about the classification of responses.

MRT

The Metropolitan Readiness Test, which was developed

by Hildreth et al., is a standardized test intended to assess the extent to which children entering grade one have achieved a sufficient degree of maturity and skill in those areas important for success in grade one. The MRT is made up of six subtests, each measuring a different aspect of the child's knowledge or ability:

1. Word Meaning - measures the child's store of verbal concepts,

2. Listening- measures the child's comprehension of orally presented sentences and paragraphs of varying complexity,

3. Matching- measures visual-perceptual skills similar to those required to discriminate word forms in beginning reading,

4. Alphabet - measures the child's ability to recognize letters,

5. Numbers- measures the child's knowledge of mathematical concepts, and

6. Copying- measures the child's visual perception and motor control similar to that needed in learning handwriting.

Chapter Four

Results and Discussion

The computations involved in the analysis of the data were performed on the University of Alberta Amdahl 470 computer using programs from the library of the Division of Educational Research Services. A probability level of 0.05 was used to determine statistical significance.

In this chapter the results of the one-way analysis of variance for the unilingual and bilingual groups on the CEFT, EWL and the MRT total will be presented first. This will be followed by a discussion of the results of the correlated t-test for the bilingual group on the EWL and FWL totals and subdivisions. Finally, the intercorrelations of the CEFT, EWL, FWL and MRT will be discussed.

The means and standard deviations for both groups on the CEFT, EWL and MRT are summarized in Table 1. A summary of the one-way analysis of variance on these variables is shown in Table 2.

The means on the CEFT for the unilingual and bilingual group are 14.20 and 14.00. Analysis of variance showed that there is no significant difference between these means. It was hypothesized that since language plays a central role in leading the child to differentiate and separate objects

Table 1

Means and Standard Deviations on the CEFT,
 EWL and FWL Totals and MRT Total for the
 Unilingual and Bilingual Groups

TESTS		UNILINGUAL	BILINGUAL
<hr/>			
CEFT			
	MEANS	14.20	14.00
	SD	4.10	5.01
<hr/>			
EWL			
PARA	MEAN	9.33	11.07
	SD	4.38	3.82
SYN	MEAN	7.62	7.46
	SD	4.38	3.77
CLANG	MEAN	3.67	2.13
	SD	5.06	3.44
<hr/>			
FWL			
PARA	MEAN		8.99
	SD		3.11
SYN	MEAN		2.39
	SD		2.80
CLANG	MEAN		2.39
	SD		2.80
<hr/>			
MRT	MEAN	68.54	74.03
	SD	8.88	7.33

Table 2

**Summary of the One-Way Analysis of Variance
for the Unilingual and Bilingual Groups
on the CEFT, EWL Totals and MRT Total**

TESTS	SOURCE	SS	DF	MS	F	P
CEFT	EFFECTS	0.82	1	0.82	0.04	0.85
	ERRORS	1636.36	76	21.53		
EWL						
PARA	EFFECTS	59.28	1	59.28	3.43	0.07
	ERRORS	1315.44	76	17.31		
SYN	EFFECTS	0.46	1	0.46	0.03	0.87
	ERRORS	1324.93	76	17.43		
CLANG	EFFECTS	46.15	1	0.05	0.02	0.89
	ERRORS	1449.03	76	2.66		
MRT TOTAL	EFFECTS	587.13	1	587.13	8.62	0.004*
	ERRORS	5174.75	76	68.09		

*p < .01

from each other and from their surroundings, children with access to and use of two languages would perform better on the type of tasks required on the CEFT than unilingual children. The children examined in this study had experienced approximately 800 hours of exposure to their second language and cannot be considered balanced bilinguals. The quantity and variety of cognitively demanding activities in which French was used was limited by time, by the kinds of learning situations possible in the classroom and by access to only one French model. It is possible that one and one-half years of bilingual education was insufficient to positively influence the bilinguals' performance on the CEFT. However, there are no indications that bilingual education in any way hampered the bilingual children's perceptual and discrimination abilities. The bilinguals performed as well as the unilinguals.

The means for the unilingual group on the EWL paradigmatic, syntagmatic and clang totals are 9.33, 7.62 and 3.67. The means for the bilingual group on the same variables are 11.07, 7.46 and 2.13. The none responses were excluded from the analysis because of the extremely low number of responses in this category. One-way analysis of variance showed that the two groups performed similarly on the EWL. None of the mean differences were significant, although the difference between the bilingual and unilingual means on the paradigmatic total approaches significance with an F of 3.43, $p = 0.07$.

The results of the word-association test in this study are quite different from those of Lambert and Tucker (1973). In their study, the bilingual sample produced as many paradigmatic responses, more syntagmatic responses and fewer clang responses than the unilingual group. These trends are not observed in the present study. It is possible that the social, environmental and educational differences between the Montreal and Edmonton situations are sufficiently large to account for the difference in the results.

In this study, the bilingual group tended to respond more paradigmatically than the unilingual group, although the difference between their means was not statistically significant. This tendency lends some support to the thesis that learning a second language may help a child to perceive the regularities of his first language more clearly. Paradigmatic responses are of the same form class as the stimulus word and Ervin (1961) suggests that the tendency to respond in this fashion increases with age and maturity, partly because of an increase in vocabulary. It could be argued that the bilingual group possessed a larger vocabulary in the sense that they had acquired two symbols for many of the referents within the limits of their classroom experience, and that knowledge of French, a language sharing many features with English, could enhance their vocabulary power.

There are several other possible explanations for the bilinguals' tendency to respond more paradigmatically than the unilinguals. Francis (1972) demonstrates that many paradigmatic responses are semantically similar to the stimulus words as well as members of the same grammatical class. Ianco-Worrall (1971) observed that bilingual children display semantic rather than phonetic preference at an earlier age than unilinguals. Perhaps the bilinguals' performance in this study is a reflection of their more quickly increasing sensitivity to word meaning.

In addition, the nature of second-language instruction must be considered. French is being presented to children in the bilingual program in a systematic, methodical fashion. In many cases, information is presented in categories, such as colours, animals, numbers and days of the week. The children are restructuring in French the conceptual framework they already possess in their first language. Because their French vocabulary may cluster around specific topics, they are perhaps more likely to respond paradigmatically to the categorical aspects of the stimulus rather than to its form class.

Two-way analysis of variance was performed as well. The sample was divided into high and low readiness groups on the basis of their MRT total scores to determine whether the paradigmatic total difference of means could be accounted for by readiness rather than by linguality. There

was no interaction between the effects of linguality and readiness, and the difference between the means was again not statistically significant.

There is a significant difference between the means for the two groups on the MRT. The mean of the unilingual group on this measure is 68.54 and for the bilingual group it is 74.03. The bilinguals' mean was significantly higher with an F of 8.62, $p < 0.05$. The MRT, which measures the child's general readiness for grade one work, was administered in September 1975, after both groups had attended one year of kindergarten, English kindergarten for the unilingual group and English/French kindergarten for the bilingual group. It is possible that the difference between the means of the MRT reflects initial differences in the sample, over which the investigator had no control. On the other hand, it could be argued that the bilingual kindergarten experience may have better prepared the bilingual group for the kinds of tasks used to estimate readiness for grade one.

A summary of the results of the correlated t-test for the bilingual group on the EWL and FWL is shown in Table 3. Each of the paradigmatic, syntagmatic and clang totals was further subdivided into noun, verb and adjective categories in order to make the response patterns more visible. Once again the none category was excluded from the analysis. The EWL paradigmatic total mean 11.08 is significantly higher

Table 3

Results of the Correlated t-Test for the Bilingual Group on the EWL and FWL Totals and Subdivisions

TESTS			MEANS	SD	P
PARA	Total	EWL	11.08	3.82	0.001**
		FWL	8.95	3.11	
	Nouns	EWL	4.59	1.74	0.74
		FWL	4.49	1.71	
	Verbs	EWL	1.92	1.59	0.21
		FWL	1.62	1.23	
	Adj.	EWL	4.56	1.72	0.001**
		FWL	2.85	1.25	
SYN	Total	EWL	7.46	3.77	0.01*
		FWL	9.31	3.44	
	Nouns	EWL	1.79	1.54	0.83
		FWL	1.85	1.55	
	Verbs	EWL	3.97	1.86	0.53
		FWL	4.13	1.70	
	Adj.	EWL	1.72	1.58	0.001**
		FWL	3.33	1.46	
CLANG	Total	EWL	2.13	3.44	0.51
		FWL	2.39	2.80	
	Nouns	EWL	0.59	1.62	0.71
		FWL	0.67	1.62	
	Verbs	EWL	0.92	1.42	0.34
		FWL	1.15	1.17	
	Adj.	EWL	0.59	1.17	1.00
		FWL	0.59	1.06	

*p< 0.01

**p< 0.001

than the FWL paradigmatic total mean, 8.95, at the $p < 0.001$ level. The bilingual children in this study come from English-speaking homes and the majority of their peers are English-speaking. Although linguistic balance measures were not administered, it is assumed that after one and one-half years of instruction in two languages, English remains the dominant language of the children in the group. Since English is the language with which these children have the greatest amount of experience, it is likely that both their conceptual vocabulary and the variety of verbal contexts in English would be greater than in French. This result tends to confirm Ervin's (1961) suggestion that paradigmatic responding is related to the size of vocabulary and to the amount of experience with words in various contexts.

The bilingual group responded significantly more syntagmatically in French than in English. The mean syntagmatic total for the EWL is 7.46, for the FWL, 9.31. This difference is significant at the 0.01 level. This tendency to respond more syntagmatically to French stimulus words may be explained by the kind of French experience the bilingual group has. The classroom teacher may be the only model of French available to the children in the program. Their interaction in French at school is on a relatively formal level compared to the kinds of English interaction they have with their families and friends. It is possible that at this stage in the bilingual program, the children rely to a certain extent upon grammatical sequences heard

frequently in the classroom. In addition, the kinds of verbal context in which the children would hear French spoken are limited by the physical properties of the classroom and the types of experience the teacher provides for her students. The children still in the early stages of learning their second language, may also be dependent to a certain degree upon context for meaning.

The analysis of responding patterns to nouns, verbs and adjectives revealed that the bilinguals responded more paradigmatically to English adjectives and more syntagmatically to French adjectives. The EWL mean for paradigmatic adjectives is 4.56, the FWL mean for this category is 2.85. The EWL syntagmatic adjectives mean is 1.72, the FWL mean is 3.33. Both differences are significant at the 0.001 level. Deese (1972) suggests that very common adjectives are more likely to elicit paradigmatic responses, whereas uncommon adjectives are more likely to elicit syntagmatic responses. All the adjectives on both word lists are high frequency within their respective languages, but if one considers that the children in the bilingual sample have heard and used English adjectives more frequently than French adjectives, Deese's suggestion is given support. Six of the seven adjectives on the FWL normally precede nouns in conversation, partly because these preceding adjectives are more frequent, and high frequency was one criterion of word selection. It is possible that if adjectives which normally

follow the noun in French had been used as stimulus words, the result might have been different.

There is no significant difference in the mean number of clang responses in English and French. An examination of the raw data indicates that the same children who responded systematically with clang responses in English responded similarly in French. Only ten children used more than three clangs on the EWL, and these same ten children account for 52 % of the clang responding in French.

The results of the intercorrelations among the CEFT, EWL and the MRT total for the unilingual group are summarized in Table 4. For the unilingual group, correlations significant at the 0.05 level of significance were found between the syntagmatic and paradigmatic totals, the clang and paradigmatic totals and the clang and syntagmatic totals. These correlations were -0.34 ($p < 0.05$), -0.55 ($p < 0.001$) and -0.58 ($p < 0.001$) respectively. These significant negative correlations reflect the nature of the test and scoring. If the subject responded paradigmatically to a stimulus word, it was not possible for him to respond with a syntagmatic or clang associate to the same stimulus.

A significant negative correlation -0.34 ($p < 0.05$) was found between the MRT total and the clang total. For the unilingual group the more ready a child is for grade one, the less likely he is to respond to the stimulus word with a clang associate. If the MRT can be assumed to be a

Table 4

**Intercorrelations Among the CEFT, EWL Totals and
MRT Total for the Unilingual Group**

TESTS	CEFT	PARA	EWL	CLANG
		PARA	SYN	
PARA	0.27			
EWL	SYN	-0.31*	-0.34*	
	CLANG	0.02	-0.55** -0.58**	
MRT TOTAL	0.16	0.31	0.08	-0.34*

*p< 0.05

**p< 0.001

valid measure of the child's general maturity level, this result supports Ervin's (1961) contention that clang responding is a more immature way of responding.

Similarly, school readiness and paradigmatic responding may be related. The correlation between the MRT total and the paradigmatic total, 0.31 ($p = 0.059$) also approaches significance. This result supports Ervin's (1961) contention that paradigmatic responding is a more mature way to respond.

The correlation between the CEFT and the syntagmatic total of -0.31 ($p < 0.05$) reaches significance. The unilinguals' tendency to associate the stimulus words with words or forms which accompany it in common verbal sequences is negatively correlated with their ability to separate an object from its environment. This result indicates that those unilingual children who are more able to distanciate objects from their contexts are less likely to respond syntagmatically.

A summary of the intercorrelations among the CEFT, EWL, FWL and MRT total for the bilingual group is given in Table 5. For the bilingual group, significant correlations were found between the CEFT and the syntagmatic total on the FWL and the MRT total. As was the case for the unilingual group, negative correlations were found among the various parts of the EWL and FWL, reflecting once again the nature of the test and scoring. Significant

Table 5

**Intercorrelations Among the CEFT, EWL and FWL
Totals and MRT Total for the Bilingual Group**

TESTS	CEFT	PARA	SYN	<u>EWL</u>		<u>FWL</u>		
				CLANG	PARA	SYN	CLANG	
<hr/>								
<u>EWL</u>								
PARA		0.09						
SYN	0.23		-0.49					
CLANG	-0.21	-0.39	-0.36					
<hr/>								
<u>EWL</u>								
PARA	-0.06	0.45*	-0.15	-0.41				
SYN	0.40*	0.05	-0.33*	-0.17	-0.61**			
CLANG	-0.24	-0.42*	-0.17	0.73**	-0.42	-0.35		
MRT	0.34*	0.29	-0.17	-0.23	-0.22	-0.05	-0.24	
<hr/>								

*p< 0.05

**p< 0.001

correlations of 0.45 ($p < 0.05$), 0.33 ($p < 0.05$) and 0.73 ($p < 0.001$) were found between the paradigmatic, syntagmatic and clang totals of the EWL and FWL. Thus, children who responded in a certain fashion on the EWL responded similarly on the FWL. It appears that the same factor which leads children to respond in a particular way in their mother tongue leads them to respond in a similar fashion in their second language.

The significant correlation between the CEFT and the MRT total, 0.34 ($p < 0.05$) indicates that readiness as estimated by the MRT is a good predictor of the bilingually educated child's ability to separate objects from their environments. This result supports the investigator's suggestion that as children mature, they become better able to distinguish an object and to consider it as an objective entity.

The significant correlation between the FWL syntagmatic total and the CEFT of 0.40 ($p < 0.05$) is puzzling. As was previously discussed, there was a significant negative correlation between the CEFT and the EWL syntagmatic total for the unilingual group, and for the bilingual on the EWL, the correlation between the CEFT and syntagmatic total is very low. The investigator suggests that language and the ability to separate objects from their contexts perhaps interact differently for unilingual and bilingual children. The unilingual group has only one

language with which to mediate their experience. The bilingual group has access to two languages, although their competency in French is not as great as their competency in English. They respond more syntagmatically to French words than to English words. At this stage in their learning of French the children are likely being encouraged to move away from isolated words towards phrases and sentences. Perhaps when their French understanding and competency is better developed, the relationship between the skills measured by the CEFT and the FWL will be different.

To summarize the results of the analysis of the data, the unilingual and bilingual groups performed in very similar ways on the various measures. Significant differences were not found for the CEFT or the EWL, although the bilinguals tended to respond more paradigmatically than the unilinguals in English. There was a significant difference between the means for the two groups on the MRT. The investigator suggests that although this result could reflect initial differences in the sample, bilingual kindergarten experience may better prepare children for grade one work.

The bilingual group performed very differently on the EWL and FWL. They responded significantly more paradigmatically in English than in French, particularly to adjectives. They responded significantly more syntagmatically in French than in English, again

particularly to adjectives. The investigator suggests that these results support Ervin's (1961) contention that paradigmatic responding increases with increase in vocabulary and in variety of verbal contextual use. These results also support the possibility that children are more reliant upon context in the early stages of learning a second language. The investigator suggests that perhaps the nature of bilingual education leads the bilingually educated child to respond with learned verbal sequences at this stage in his development.

A significant negative correlation was found between the MRT total and the clang total for the unilingual group. The correlation between the MRT and the paradigmatic total was positive and approached significance. The investigator suggests that this result supports Ervin's (1961) contention that clang responding is less mature than paradigmatic responding. The correlation for this group between the CEFT and the syntagmatic total is negative and approaches significance. The researcher suggests that for unilingual children, the ability to separate objects from their surroundings and to separate words from their verbal contexts are inversely related. The more able the child is to distinguish objects from their contexts, the less likely he is to respond syntagmatically.

Significant correlations were found between the various parts of the EWL and FWL for the bilingual group,

indicating that the bilingual children responded in similar ways in English and in French. A significant correlation was found between the CEFT and the MRT for this group, supporting the suggestion that as children mature, they become more able to separate objects from their contexts. No explanation is offered for the significant positive correlation between the FWL syntagmatic total and the CEFT.

In chapter three, three questions were posed. The answer to the first question, "Do the bilingually educated children perform significantly differently on a measure of perceptual ability, the Children's Embedded Figures Test?" is no. The bilingually educated children perform as well as but not better than the unilingually educated children. The answer to the second question, "Do bilingually and unilingually educated children respond significantly differently to a list of English stimulus words" , is a partial yes. The bilingually educated children tended to give more paradigmatic associates than the unilingually educated children, but otherwise, their response patterns were basically similar. The answer to the third question, "Do bilingually educated children respond significantly differently to stimulus words in English than they do to stimulus words in French?", is yes. The bilingually educated children respond more paradigmatically in English, particularly to adjectives, and more syntagmatically in French, again particularly to adjectives.

Chapter Five

Summary, Implications and Further Research

Summary

The aim of this study was two-fold. First, an attempt was made to determine whether bilingual education influences children's ability to separate objects from their contexts. Second, the word association patterns of unilinguals and bilinguals were compared to determine whether acquiring a second language affects the patterns of response in a child's first language and to determine the differences between bilingual children's responses in their first and second languages.

Seventy-eight children, thirty-nine unilingually educated and thirty-nine bilingually educated, participated in this study. The children were drawn from bilingual English-French and unilingual English grade one classes from two Edmonton schools. The average age for both the unilingual and bilingual groups was 6 years 5 months. All children came from unilingual English-speaking homes and all had attended kindergarten. The bilingual group had attended bilingual kindergarten and the unilingual group had attended unilingual kindergarten. The Children's

Embedded Figures Test (CEFT) (Karp et al., 1963) and the EWL, devised by the author, were administered to both groups. The bilingual group was also given the FWL, also devised by the author. Testing was conducted orally and individually in January and February of 1976. The Metropolitan Readiness Test (MRT) (Hildreth et al., 1969) scores, taken from the cumulative records, were also included in the analysis.

One-way analysis of variance was performed in order to determine whether any of the group means on the CEFT, EWL or MRT were significantly different. A correlated t-test was performed to determine whether the bilingual group responded significantly differently to the EWL and the FWL. Intercorrelations among the CEFT, EWL and MRT were found for the unilingual group, and the intercorrelations among the CEFT, EWL, FWL, and MRT were calculated for the bilingual group in order to determine the relationships between these measures.

The one-way analysis of variance revealed that the two groups performed in a similar fashion on the CEFT and EWL. There were no significant differences between the unilingual and bilingual means on the CEFT or EWL subdivisions. Although the bilingual group tended to respond more paradigmatically than the unilingual group on the EWL, the difference did not reach statistical significance. The mean for the bilingual group on the MRT

was statistically higher than that for the unilingual group.

The results of the correlated t-test of the EWL and FWL indicated that the bilinguals respond more paradigmatically to English words, particularly to adjectives, and more syntagmatically to French words, again particularly to adjectives.

For the unilingual group, statistically significant negative correlations were found between the CEFT and the EWL syntagmatic total and between the MRT total and the EWL clang total. The positive correlation between the MRT total and EWL paradigmatic total approached significance. Statistically significant correlations were also found among the subdivisions of the EWL, which reflect the nature of the test and its scoring. No other significant correlations were found for the unilingual group. For the bilingual group, statistically significant correlations were found between the CEFT and the FWL syntagmatic total and between the CEFT and the MRT total. Statistically significant correlations were found between the paradigmatic, syntagmatic and clang totals on the two versions of the word list. As for the unilingual group, statistically significant negative correlations were found among the subdivisions of the EWL and FWL, reflecting the nature of the test and its scoring. No other statistically significant correlations were found for the bilingual

group.

Even though there were no statistically significant differences between the two groups, with the exception of the bilinguals' higher mean on the MRT, the bilingual group performed as well or better than the unilinguals on all measures. These findings suggest that bilingual experience in kindergarten and grade one in no way hampered the children's cognitive or linguistic abilities as measured by the CEFT, EWL and FWL, or MRT. In addition, children in the bilingual group have the advantage of access to a second language.

Implications

Cohen and Swain (1976) list seventeen factors common to those bilingual programs where success has been reported. Although as Macnamara (1974) points out, each bilingual project is unique, the program examined in the present study resembles many of the programs in other areas and meets many of the criteria listed by Cohen and Swain. First, all of the children participating in the program come from middle-class homes. All were unilingual English-speaking when they entered the program. Participation in the program is voluntary and children are not selected on the basis of intelligence, personality factors or language ability. French is used as a medium of instruction in this program and is not approached as a second-language course.

All teachers are fluent bilinguals. Parents of children enrolled in the bilingual classes are highly motivated and involved to some degree in the planning and execution of policy and activities.

The Canadian program which most closely resembles the Edmonton program examined in this study is the Elgin County program in St. Thomas, Ontario, a unilingual English-speaking community. Like the Edmonton program, the Elgin County project is a 50%/50% English/French partial immersion program. The children in St. Thomas study mathematics, music and French language arts in French; and the balance of the core and option subjects including English language arts in English. In the Edmonton program, music, art, physical education and French language arts are taught in French and mathematics, science and English language arts are taught in English. In both communities reading and writing are initially introduced in English. One perhaps important difference between these two projects is that in Edmonton, children enter the bilingual route in kindergarten, whereas the St. Thomas program begins in grade one.

To the extent that research results are generalizable from one bilingual situation to another, the results of an Elgin County study may be useful in making predictions and implications about the future possible success of the Edmonton program. Barik and Swain (1974) discuss a

longitudinal evaluation of the St. Thomas program in grades one, two and three. In grade one the children were given the MRT, an IQ measure, an English achievement measure, a mathematics test and a French comprehension test. In grades two and three, they were given a similar battery of tests, excluding the readiness measure. The results for the bilingual group were compared with the results for unilingual controls and for bilingual total immersion groups in other centers in Ontario.

In general, the results were disappointing. There was no significant difference in readiness at the beginning of grade one and no significant differences in IQ or mathematical ability in any of the three grade levels. The results indicated that total immersion leads to the same or better native language ability as partial immersion, and that French language ability develops more slowly in the partial immersion situation.

Although direct parallels cannot be drawn between the test results in St. Thomas and the results of the measures used in the present study, some comparisons may be made. It is possible that total immersion kindergarten as experienced by the children in the Edmonton sample may have influenced their readiness for grade one. In the unilingual kindergarten, social, physical, intellectual, cultural and emotional development is encouraged and activities are designed to promote growth in these areas. Observation of

the classes by the investigator and discussions with a representative of the Second Languages Department of the Edmonton Public School Board revealed that in the bilingual kindergarten, many of the concepts and ideas already understood by the children in English are reinforced and relearned in French. New concepts are presented and learned in French. In the bilingual kindergarten, in addition to the kinds of learning encouraged in the unilingual setting, the development of second language skills is emphasized. This extra emphasis on language development and reinforcement of concepts may have better prepared children in the bilingual program for grade one. The advantage of approximately 460 hours of French experience would most certainly affect their readiness for French learning in grade one as compared to that of the children participating in the Elgin County project, whose first contact with French was after starting first grade. In any case, the bilingual group in the present study performed better on the MRT than the unilingual group, who had also attended kindergarten, and although this result may partially reflect initial differences between the two groups, it is possible that one year of bilingual experience was also a contributing factor.

Peal and Lambert (1962), Liedtke and Nelson (1968), Ianco-Worrall (1972), and Bain (1974) have reported that children who are equally skilled in their two languages

experience cognitive advantages over their unilingual counterparts in a variety of intellectual and conceptual areas. The majority of the students involved in their studies had had continuous bilingual experience at home and at school. Cummins and Gulutsan (1974) have shown that children from unilingual French and English speaking homes may also experience cognitive advantages as a result of bilingual immersion experience. Barik and Swain (1974) found no evidence of cognitive advantage for the bilingual group in their evaluation over three years of the Elgin County project. In the present study, the bilingual group performed as well as but not better than the unilingual group on the CEFT, a measure of differentiation ability.

Several differences between the above mentioned research designs and the programs studied may account for the differing results. First, it is important to consider the ages of the samples studied by the above mentioned researchers. In Peal and Lambert's study, the average age of the sample was 10 years, and in the studies of Cummins and Gulutsan and Bain, grade six students were studied. The children participating in these studies had experienced ten to twelve years of continuous bilingual interaction at home and at school. Grade one children participating in the Elgin County study had had roughly 400 hours or one month of experience with French at the time of testing. Similarly, the children involved in the present study had had about 800 hours or two months of French experience when

they were tested, distributed over a period of seventeen months.

The bilingual children studied by Liedtke and Nelson and Ianco-Worrall were of approximately the same age as those studied by Barik and Swain and this investigator, but once again, the samples in these first two cases were balanced bilinguals who had had continuous bilingual experience for four to nine years. It may not be expected that children in partial immersion programs with limited bilingual experience both in terms of amount of time spent in the second language and in terms of the number and variety of contexts in which they have heard or spoken the second language will display signs of cognitive advantage at the early levels of their bilingual study.

Secondly, the social interaction experienced by the children in the various studies is likely qualitatively different. The bilingual groups studied by Peal and Lambert, Liedtke and Nelson, Ianco-Worrall, Bain and part of the group studied by Cummins and Gulutsan spoke and heard their two languages in a variety of situations: at home with their families, at play with their peers and at school with their teachers and classmates. The children from unilingual homes who participated in the study performed by Cummins and Gulutsan had opportunities to acquire bilingual friends or friends from homes where their other language was spoken. Children from all three home

language backgrounds attended the same classes and therefore the teachers was not the only second language model. In both the St. Thomas and the present study, second language experience was restricted to the classroom with the teacher acting as the only second language model. Children in both of these situations did not have the same opportunities to meet and interact with unilingual French-speakers or with bilingual speakers of English and French. As has been emphasized throughout this study, cognitively demanding interaction with caring adults is an important factor for cognitive development. It would appear that the amount of time spent interacting with the teacher of the bilingual class, some fraction of the total amount of time devoted to French interaction for each individual child, may be insufficient in the early stages of bilingual immersion to lead children to the kinds of cognitive advantage reported by many of the previously mentioned researchers.

It is possible that as they mature and their bilingual experience increases, the children enrolled in the Edmonton Public School System's bilingual program may demonstrate cognitive advantage over their unilingual peers. Lambert and Tucker (1973, 1974) report that in the earlier grades, the children following the St. Lambert bilingual program showed no signs of cognitive or linguistic advantage over their unilingual controls. However, by grade four or five, the bilingual group tended to perform as well as or better than the unilingual groups on a wide variety of measures.

Although the social climate and the kinds of opportunities for interaction with bilinguals and speakers of French in Montreal may be qualitatively different from those in Edmonton and may have contributed to the success of the St. Lambert project, this tendency will perhaps become evident within the Edmonton program in future years. In any case in the present study, as in the Elgin County study, there is no evidence that the bilinguals' intellectual and cognitive development has in any way been hindered by their two-language experience.

The results of the English ability testing of the Elgin County project revealed that children enrolled in the partial immersion program were not as competent as either the unilingual controls nor their counterparts in total immersion programs. Although once again direct parallels cannot be drawn between the St. Thomas experiment and the present research, the bilingual group in the present study performed as well as the unilingual group on the English linguistic measure, the EWL, and displayed a tendency to respond in a more mature fashion than the unilinguals to English words. These results support Ervin's (1961) suggestion that as vocabulary and experience with words in varying contexts increases, so does the tendency to respond paradigmatically. The bilingual children in this study have two words for many of the objects in their environment because they have been using French to refer to classroom

activities, materials and objects for one and one half years, and in this sense, they have a larger vocabulary than their unilingual peers. An examination of the amount of time devoted to English and French language arts in grade one, which is summarized in the appendix, reveals that children in the bilingual classes spend more time reading, writing, speaking and listening than children in the unilingual classes because they practice these skills in two languages. In this sense they have more experience with words. This too may help to account for the bilinguals tendency to respond more paradigmatically.

Francis (1972) demonstrated that paradigmatic responding may be explained on the basis of semantic similarity between the stimulus and the associated as well as on the basis of grammatical class similarity. Ianco-Worrall (1972) has shown that bilingual children may display semantic rather than phonetic preference at an earlier age than unilingual children. Perhaps the bilingual children in this study tend to respond more paradigmatically than the unilinguals to the EWL because they are becoming more rapidly aware of the ways in which words may be combined into meaningful categories on the basis of semantic similarity. In kindergarten and in grade one French activities, the bilingual children have been concentrating on concepts already learned in English, such as colours, numbers, days of the week, parts of the body and opposition, and this reinforcement of categories with

which they are already familiar in their first language may have influenced their response patterns on the EWL.

The correlated t-test of the EWL and FWL results revealed that the bilingual group responded more paradigmatically in English, the language with which they are most familiar and in which they have the largest vocabulary and syntactical knowledge. In French they responded more syntagmatically, displaying that their contextual variety in this language is limited. These results also support Ervin's (1961) contention that as vocabulary and range of contextual usage for words increases, the tendency to respond paradigmatically increases. This possibility has important implications for teachers of second languages, both in the bilingual setting and in the second-language option setting.

It is important that the second-language teacher provide as many examples as possible for the kinds of structures and concepts being presented and that she encourage the use of the second language in as many varied situations as possible. Learning a second language in an immersion situation is very different from learning a first language in the home. The teacher is often the only model of the second language available to the children, and since situational variety is limited by the physical properties of the classroom and by the nature of classroom experiences, the children may be somewhat limited in their

acquisition of vocabulary and syntax. The teacher is dependent upon the materials and objects in the classroom which she may use to illustrate or explain the structures and concepts she is teaching, and she must divide her attention among many children. Bilingually educated children may be reluctant to experiment with their second language at the early stages of bilingual immersion because they must rely on context to a great extent for meaning. They may depend upon learned grammatical sequences to a great extent in their early communication. Because their vocabulary and experience with the language is limited, they may be unable to generalize the regularities within the language, such as plural forms and tenses. It is also possible that in the early stages of their second language learning, the children may have difficulty generalizing their experiences in the second language to situations outside the classroom.

The unilingual teacher of the first language should also be encouraged to provide experience with words in a wide variety of linguistic and situational contexts, particularly for those children whose language experience at home is limited.

Suggestions for Further Research

On the basis of the findings of the present study, the investigator would make the following suggestions for

further research.

1. A longitudinal study using the same sample could be made to determine whether the kinds of cognitive and linguistic differences observed in the research of Lambert and Tucker (1973, 1974) and others will become evident in future years of the Edmonton Public School's bilingual program. Tests similar to those used in the St. Lambert study could be used to evaluate the progress of children in the program.

This same study could incorporate word lists similar to those employed in the present study to determine whether the bilinguals' tendency to respond more paradigmatically than the unilinguals to English become increasingly evident. It would also be interesting to note whether their tendency to respond more paradigmatically to English and more syntagmatically to French continues.

2. A similar study could be performed using a larger sample selected from different schools and from the classes of different teachers, perhaps including a French control group in addition to the English control group.

3. Since only the English-French home-school language switch was considered in this study, similar studies could be performed using samples from other language switch programs, such as the English-Ukrainian bilingual program in the city of Edmonton to determine whether similar

patterns emerge when languages other than French are used as the media of instruction.

4. In the present study, initial differences in the readiness of children entering the kindergarten program were not available. It was suggested by the investigator the bilingual experiences in kindergarten may have contributed to the bilingual group's higher scores on the MRT upon entering grade one. A study could be performed to determine the validity of this suggestion.

5. The investigator of the present study suggested that the results of the FWL might have been different if the adjectives on the FWL normally followed the noun, as do the majority of French adjectives. A study examining this aspect would be of interest.

6. It would be interesting to perform a study to examine and analyse the kinds of errors made by children learning a second-language in a bilingual immersion setting. The types of grammatical errors and of first language interferences could be compared with those of children learning the second language in option courses at various grade levels to determine the ways in which they differ or are similar. Information from such a comparison could be a useful evaluation tool for teachers of both bilingual classes and option second-language classes. It would also be of interest to compare errors made by children in each second-language learning situation with

those made by children learning their first language. Such a comparison would perhaps highlight some of the major differences between first-language acquisition in the home, bilingual immersion at school and second-language learning in option courses.

7. It would be interesting to follow the progress of those children who for various reasons drop out of the immersion route. If these children chose to continue in the unilingual route because of academic difficulty experienced in the bilingual program, it would be interesting to note whether their academic performance in the unilingual classes improved once bilingual instruction had ceased. It would also be interesting to compare the performance of these children in later second-language study with that of unilingual children not enrolled in the bilingual program at any time.

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Appendix

Unrevised English and French Word Lists

English	French
1. table	table
2. first	premier
3. how	comment
4. also	aussi
5. talk	parle
6. because	parce que
8. child	enfant
9. on	sur
10. come	vient
11. my	mon
12. always	toujours
13. red	rouge
14. he	il
15. house	maison
16. who	qui
17. hot	chaud
18. make	fait
19. when	quand
20. him	lui
21. give	donne
22. window	fenêtre
23. five	cinq

Revised English and French Word Lists

English	French
1. good	donne
2. table	chante
3. window	cinq
4. pretty	enfant
5. first	table
6. five	fais
7. apple	gentil
8. make	petit
9. house	mercredi
10. talk	maison
11. Wednesday	premier
12. come	jaune
13. yellow	parle
14. give	écoute
15. sing	pomme
16. dog	chien
17. eat	joli
18. little	bon
19. nice	fenêtre
20. child	mange
21. listen	vient

**Summary of Time Allotment in the
Bilingual Grade One Classes***

<u>Language Spoken</u>	<u>Subject</u>	<u>No. of Min.</u> <u>Per Week</u>	<u>Recommended</u>	
			Min.	Max.
ENGLISH	Lang. Arts	375	500	725
	Mathematics	150	180	270
	Science	60	90	120
FRENCH	Lang. Arts and S.S. (combined)	375	200**	300**
	Music	80	70	
	Art	80	70	
	Phys. Ed.	80	90	

* These figures vary somewhat from class to class but are suggested by the Edmonton Public School Board.

** For social studies.

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